



## Material Safety Data Sheet Summary Form

information on Tier A & B substances required to be accessible onsite pursuant to NAC 459.95412(2a)

**Facility:** \_\_\_\_\_; **Process:** \_\_\_\_\_

Substance	CAS Number	Company Name on MSDS	MSDS Revision No.	MSDS Revision Date	Required Information (see legend)						
					TI	PEL	PD	RD	CD	T&C	HEM

### Required Information Legend:

TI - Toxicity Information

PEL - Permissible Exposure Limits

PD - Physical Data

RD - Reactivity Data

CD - Corrosivity Data

T&C - Thermal & Chemical stability data

HEM - foreseeable Hazardous Effects of inadvertent Mixing of different materials

### For each of the required information elements, note one of the following:

M - Means required information is available onsite on the denoted MSDS sheet

O - Means required information is available onsite in sources other than the MSDS sheet

N/A - Means required information does not apply to this particular substance

X - Means required information is not available onsite and it must be obtained



## **Design & Construction Code Definition and Compliance Evaluation Checklists**

definition of applicable design & construction codes required pursuant to NAC 459.95412(2c6)

Definition of applicable design and construction codes under CAPP is limited to applicable codes for the regulated processes. Building structures are not typically of concern under this section of the NAC, as it is assumed that local building codes are fully enforced by the appropriate state, county or municipal agency. However, if a defect in the design or construction of a building structure could adversely affect the regulated process and the building did not receive review by building officials and did not obtain permits to construct and occupy, those codes should be noted as being applicable under this section.

Design and construction codes must be differentiated from material specifications, such as those developed by the American Society for Testing and Materials (ASTM). Materials specifications for the process-specific equipment and instruments should be compiled and evaluated pursuant to section 4 of this audit checklist.

The defined design and construction codes must include those that apply to the following process components:

- Foundations
- Structural Steel
- Pressure Vessels
- Piping
- Instruments and Controls
- Electrical Systems
- Storage Tanks

The design and construction codes may cover all or part of the following:

- Design parameters & calculation procedures
- Materials of construction
- Construction personnel qualifications
- Construction requirements
- Inspection requirements
- Testing requirements

Not all design and construction codes that apply to a process regulated under CAPP, have been adopted by local building officials. CAPP requires the regulated facility to design and construct in accordance with all applicable codes and standards, or best engineering practices. While compliance with these codes or engineering practices may not be mandatory per local building officials, they become mandatory under CAPP, and full compliance is required. The correct list of applicable codes and standards vary, based upon the type of process and the industry. The list below denotes codes and standards that may apply to the process. While it is not comprehensive, it does present a significant number of codes and standards that could apply. Actual definition of applicable codes and standards is the responsibility of the facility, as is compliance confirmation. Documented codes, standards or engineering practices must apply to the design and construction of each of the process components listed below.



## COMMON DESIGN CODES AND STANDARDS USED IN THE CHEMICAL AND PETROLEUM INDUSTRIES

CODE	RESOURCE	COVERAGE OF CODE
<b>Foundations</b>		
American Concrete Institute 318 Building Code Requirements for Structural Concrete	American Concrete Institute P.O. Box 9094 Farmington Hills, MI 48333 248-848-3700 www.aci-int.net	Design and construction of structural concrete.
<b>Structural Steel</b>		
American Welding Society D 1.1 Structural Welding Code - Steel	The American Welding Society 550 NW LeJeune Road Miami, FL 33126 800-443-9353 www.aws.org	Includes structural steel weld design, prequalification & testing procedures.
<b>Pressure Vessels</b>		
American Society of Mechanical Engineers Boiler & Pressure Vessel Code Section VIII, Divisions 1 - 3, Pressure Vessels	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990 800-THE-ASME www.asme.org	Design, fabrication, inspection, testing & certification of pressure vessels operating at internal or external pressures exceeding 15 psi. (These requirements are usually met by the pressure vessel manufacturer and a vessel code plate certifying compliance with ASME BPV Section VIII must be affixed.) Also prescribes requirements for pressure relief. Refer to Instruments & Controls section for codes and standards related to pressure relief.
Chlorine Institute Pamphlet 5 Non-Refrigerated Liquid Chlorine Storage	The Chlorine Institute, Inc. 2001 L Street, N.W., Suite 506 Washington, D.C. 20036 202-775-2790 www.cl2.com	Design, construction, location, installation and operation of non-refrigerated liquid chlorine storage systems. Requires compliance with ASME BPV Section VIII, but also specifies additional requirements.
American Society of Heating, Refrigerating and Air- conditioning Engineers, Inc. ASHRAE/ANSI 15 Safety Code for Mechanical Refrigeration	American Society of Heating, Refrigerating and Air- conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329 404-636-8400 www.ashrae.org	Requires pressure vessels to comply with ASME BPV Section VIII.
National Fire Protection Association NFPA-58 Storage and Handling of Liquefied Petroleum Gases	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Prescribes requirements for LP Gas system design and installation. Refers to ASME pressure vessels and DOT containers.

<b>Piping</b>		
American Society of Mechanical Engineers ASME/ANSI B31.3 Process Piping	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990 800-THE-ASME www.asme.org	Design, installation, construction inspection & testing of process piping in petroleum refineries; chemical, pharmaceutical, textile, paper, semiconductor, & cryogenic plants; and related processing plants & terminals. Prescribes requirements for: Materials Pipe design criteria Fabrication (incl. welding procedures & welder qualification) Pipeline inspection during construction Pipeline testing prior to operation Inspection & testing record keeping
American Society of Mechanical Engineers ASME/ANSI B31.4 Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990 800-THE-ASME www.asme.org	Design, installation, construction inspection & testing of process piping in transportation corridors between facility's plants, terminals, tank farms, etc. Prescribes requirements for: Materials Pipe design criteria Fabrication (incl. welding procedures & welder qualification) Pipeline inspection during construction Pipeline testing prior to operation Inspection & testing record keeping
American Society of Mechanical Engineers ASME/ANSI B31.5 Refrigeration Piping	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990 800-THE-ASME www.asme.org	Design, installation, construction inspection & testing of refrigerant & secondary cooling piping systems. Prescribes requirements for: Materials Pipe design criteria Fabrication (incl. welding procedures & welder qualification) Pipeline inspection during construction Pipeline testing prior to operation Inspection & testing record keeping
American Society of Mechanical Engineers Boiler & Pressure Vessel Code Section IX, Welding & Brazing Qualifications	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990 800-THE-ASME www.asme.org	Contains rules related to qualification of welding procedures and qualification of welders. This section required pursuant to ASME/ANSI B31.3 and in some cases B31.4.
American Petroleum Institute API 1104 Welding of Pipelines & Related Facilities	American Petroleum Institute 1220 L Street, NW Washington, DC 20005 202-682-8000 www.api.org	Contains the welding standards that are required pursuant to ASME/ANSI B31.4.

Chlorine Institute  Pamphlet 6 Piping Systems for Dry Chlorine	The Chlorine Institute, Inc. 2001 L Street, N.W., Suite 506 Washington, D.C. 20036 202-775-2790 www.cl2.com	Recommends piping and piping component materials for use in dry chlorine systems. Requires welding & inspection comply with ASME/ANSI B31.3 and ASME Boiler & Pressure Vessel Code, Section IX.
American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. ASHRAE/ANSI 15 Safety Code for Mechanical Refrigeration	American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329 404-636-8400 www.ashrae.org	Requires piping & piping components having maximum internal or external design pressure greater than 15 psi to: - Be listed either by component, or as an assembly, by an approved nationally recognized laboratory; or - Comply with ASME/ANSI B31.5 (where applicable. See code for explanation)
National Fire Protection Association NFPA-58 Storage and Handling of Liquefied Petroleum Gases	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Prescribes requirements for LP Gas system design and installation. Requires compliance with ASME/ANSI B31.3 and ASME BPV Code Section IX for pipe design and installation.
U.S. Department of Transportation 49CFR, Parts 192 / 195 Transportation of Natural & Other Gas by Pipeline/ Transportation of Hazardous Liquids by Pipeline	U.S. Government Printing Office 888-293-6498 www.access.gpo.gov	These federal regulations do not generally apply within the CAPP-covered process boundary, however, if a process receives material from a DOT-covered pipeline, DOT jurisdiction may extend into a portion of the CAPP-covered process.
<b>Instruments &amp; Controls</b>		
ISA Numerous Publications & Standards	ISA 67 Alexander Drive Research Triangle Park, NC 27709 919-549-8411 www.isa.org	This is the International Society for Measurement & Control. Numerous publications and standards exist. Publications exist related to P&ID and loop diagram preparation. Numerous standards include those related to performance standards for many toxic gas sensors and the operation & maintenance of select instrumentation.
American Petroleum Institute API Recommended Practice 520 Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries (Parts I & II)	American Petroleum Institute 1220 L Street, NW Washington, DC 20005 202-682-8000 www.api.org	Sizing, selection and installation of pressure relieving devices.
Chlorine Institute Pamphlet 5 Non-Refrigerated Liquid Chlorine Storage	The Chlorine Institute, Inc. 2001 L Street, N.W., Suite 506 Washington, D.C. 20036 202-775-2790 www.cl2.com	Provides pressure relief valve sizing criteria for non-refrigerated chlorine storage tanks.
American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. ASHRAE/ANSI 15 Safety Code for Mechanical Refrigeration	American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329 404-636-8400 www.ashrae.org	Provides pressure relief valve requirements for entire refrigeration system, including the sizing criteria. Also provides requirements for some system instrumentation.

National Fire Protection Association NFPA-58 Storage and Handling of Liquefied Petroleum Gases	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Prescribes requirements for LP Gas system design and installation. Pressure relief valve installation criteria and sizing information is provided.
National Fire Protection Association NFPA-30 Flammable & Combustible Liquids Code	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Prescribes requirements for the design of flammable & combustible liquid storage tanks and associated piping systems. Defines storage tank venting requirements.
<b>Electrical Systems</b>		
National Fire Protection Association NFPA-70 National Electric Code	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Safety in the specification and installation of electrical wiring and equipment in all types of installations. Most specifically related to CAPP, the code defines hazardous (classified) locations and the requirements for electrical installations in these areas.
National Fire Protection Association NFPA-497 Recommended Practice for Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Provides recommendations on determining the extent of classified locations as defined in the National Electric Code. It can be used to evaluate processes where flammable liquids, gases or vapors are present.
American Petroleum Institute API Recommended Practice 500 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities	American Petroleum Institute 1220 L Street, NW Washington, DC 20005 202-682-8000 www.api.org	Provides recommendations on determining the extent of classified locations as defined in the National Electric Code. It can be used to evaluate processes in petroleum facilities.
National Fire Protection Association NFPA-58 Storage and Handling of Liquefied Petroleum Gases	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Prescribes requirements for LP Gas system design and installation. Defines extent of classified areas in LP Gas systems.

<b>Storage Tanks</b>		
National Fire Protection Association NFPA-30 Flammable & Combustible Liquids Code	National Fire Protection Assoc. 1 Batterymarch Park PO Box 9101 Quincy, MA 02269-9101 800-344-3555 www.nfpa.org	Prescribes requirements for design of flammable & combustible liquid storage tanks and associated piping systems. Cross references API Standard 650, ASME BPV code Section VIII and various Underwriters Laboratory standards for tank manufacture.
American Petroleum Institute API Standard 650 Welded Steel Tanks for Oil Storage	American Petroleum Institute 1220 L Street, NW Washington, DC 20005 202-682-8000 www.api.org	Prescribes requirements for the design, fabrication, erection and testing of welded steel atmospheric storage tanks.

## GENERAL DESIGN AND CONSTRUCTION SPECIFICATIONS

General design and construction specifications are typically used by facilities and engineering & construction firms in conjunction with the nationally recognized design codes and standards noted on the previous table. These general specifications are used to define specific company requirements related to design and construction, such as company policies and practices (like purchasing, document control, etc.) and site-specific design and construction parameters (such as pipe/pressure vessel corrosion allowances, soil compaction requirements, weld inspection criteria, etc.). These general specifications are also used to define specifically which nationally recognized design codes and standards apply. The following table lists general specifications that may apply to a facility process.

## COMMON GENERAL SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF FACILITY PROCESSES

<b>GENERAL SPECIFICATION</b>	<b>CONTENTS</b>
Site Grading	Applicable codes, site clearing, importing/exporting requirements related to cut & fill, site compaction requirements, examination & testing, required documentation.
Foundations	Applicable codes, base & sub base requirements, concrete & reinforcing design requirements, base compaction and concrete testing requirements, inspection requirements, required documentation.
Drawing & Documentation	Project management requirements related to drawing & document development, approvals, document control.
Piping	Applicable codes, piping design criteria, material selection, layout and equipment connection, required documentation.
Piping Fabrication	Applicable codes, piping fabrication, welding, heat treatment, examination and testing, required documentation.
Pressure Vessels	Applicable codes, design criteria, materials of construction, fabrication requirements, required documentation.
Installation of Instruments & Controls	Installation requirements, materials of construction, approved vendors.
Steel Structures	Applicable codes, materials of construction, required documentation.

GENERAL SPECIFICATION	CONTENTS
Structural Welding & Weld Inspection	Applicable codes, weld procedures, welder qualification, production weld inspection & testing, required documentation.
Electrical Installation	Applicable codes, operating voltage levels, specific electrical equipment & wiring requirements, required documentation.
Protective Coatings	Paint systems, surface preparation, paint application, inspection, required documentation.

Once applicable codes and specifications have been defined, compliance with those codes and specifications must be evaluated. In general, the process must be in compliance with the version of the code in place at the time of construction, unless dictated otherwise by authorities having jurisdiction.

Although not mandatory, differences between current code versions and the version in place at the time of construction should be understood. As an additional hazard identification step, the process should be reviewed to determine compliance with the current code version, and if not in compliance, determine if any additional hazards exist. The facility should then implement further safeguards or mitigation measures as warranted by the code deficiency.

### CODE COMPLIANCE EVALUATION CHECKLIST

<b>Facility:</b>		
<b>Process:</b>		
APPLICABLE CODE or GENERAL SPECIFICATION (VERSION?)	IN COMPLIANCE WITH CODE or GENERAL SPEC?	AVAILABLE DOCUMENTATION SUPPORTING COMPLIANCE
<b>Foundations</b>		
<b>Structural Steel</b>		



<b>Pressure Vessels</b>		
<b>Piping</b>		
<b>Instruments &amp; Controls</b>		
<b>Electrical Systems</b>		
<b>Storage Tanks</b>		